

ABSTRACT

A hybrid semiconductor device is presented in which one or more diode regions are integrated into a transistor region. In a preferred embodiment the transistor region is a continuous (self-terminating) SOI LDMOS device in which are integrated one or more diode portions. Within the diode portions, since there is only one PN junction, the mechanism for breakdown failure due to bipolar turn-on is nonexistent. The diode regions are formed such that they have a lower breakdown voltage than the transistor region, and thus any transient voltage (or current) induced breakdown is necessarily contained in the diode regions. In a preferred embodiment, the breakdown voltage of the diode portions is lowered by narrowing their field plate length relative to the transistor portion of the device. This allows the device to survive any such breakdown without being destroyed, resulting in a more rugged and more reliable device.